

## Obituary.

DR. E. B. KNOBEL.

EDWARD BALL KNOBEL, who died on July 25 last, was born in London on Oct. 21, 1841. He was educated at Stockwell Grammar School and at the Royal School of Mines, but did not take a university degree; he was given an honorary D.Sc. at Oxford in 1927. He was engaged in business as a manufacturer throughout the greater part of his life, and his work for astronomy could be done only in his leisure hours.

Dr. Knobel's published work began in 1873 with papers containing observations, illustrated by sketches, of Jupiter and Mars. He also invented a photometer and produced two papers on observations made with it. But his work as an observer was terminated by his removal from Burton to London in 1875. There he found an opportunity for studying astronomical bibliography, which determined the main drift of his studies for the rest of his life. In 1876 he presented to the Royal Astronomical Society a "Chronology of Star Catalogues", dealing with all the star catalogues the existence of which he could trace. With unimportant exceptions he had examined them all with his own eyes. To this collection he added a separate collection of catalogues of proper motions and a table of the names and places of stars contained in Aboul Hhassan's first catalogue. He also included notes on errors in texts of Ulugh Beg and Cusa, which, like those in the text of Aboul Hhassan, he attributed to misreadings of Arabic numerals. In the same year Dr. Knobel published a reference catalogue of books and papers on double stars, variable stars, red stars, nebulae and clusters, proper motions, stellar parallax, and star spectra.

During the next forty years Dr. Knobel produced numerous papers on points connected with star catalogues, including those of Ulugh Beg, Al Sufi, and Al Achsasi, in which he displayed a growing

confidence in his reading of Arabic and Persian manuscripts. He also published in 1905 a collection of the observations contained in the Japanese chronicle, the Nihongi, and edited a Chinese planisphere in 1909 with a valuable commentary. But Dr. Knobel's largest works were his editions of the star catalogues of Ptolemy and Ulugh Beg, published in 1915 and 1917 respectively. In each case the work had been begun by the German-American astronomer Peters, who died in 1890 and whose papers passed into Dr. Knobel's hands. In neither case did Dr. Knobel give a critical Greek or Persian text, but the work is based on a careful collation of the manuscripts in different languages for star places and magnitudes, and each star was identified, so far as identification is possible.

Probably Dr. Knobel contributed even more to astronomy by his long and devoted service to the Royal Astronomical Society than by his publications. Except for the one year, 1922-23, he was a member of its council uninterruptedly from 1876 to his death. He was twice president, 1892-93 and 1900-1; for fifteen years he was treasurer and for ten years secretary, and he will be remembered with gratitude by all British astronomers.

J. K. F.

WE regret to announce the following deaths:

Prof. A. Gullstrand, formerly professor of physiological and physical optics at the University of Uppsala, and Nobel prizeman for medicine in 1911, aged sixty-eight years.

M. Joseph Achilles Le Bel, For. Mem. R.S., formerly president of the French Chemical Society, on Aug. 8, aged eighty-three years.

Prof. J. F. Pompeckj, professor of geology and palaeontology in the University of Berlin, on July 8, aged sixty-three years.

Dr. Harvey Washington Wiley, from 1883 to 1912 chief chemist of the U.S. Department of Agriculture, on June 30, aged eighty-five years.

## News and Views.

THE lives and labours of those eminent English botanists and naturalist travellers, Sir William and Sir Joseph Hooker, and their connexion with Halesworth, Suffolk, will receive recognition on Aug. 17, through the unveiling of a tablet memorial in St. Mary's Church, Halesworth, a dedicatory duty to be performed by Sir David Prain, a former director of the Royal Botanic Gardens, Kew. The requisite funds for the erection of the tablet were provided by a number of representative scientific institutions, supplemented by contributions from a small band of botanists and others who were contemporary with Sir Joseph Hooker.

SIR WILLIAM HOOKER, born at Norwich on July 6, 1785, was educated there at the grammar school. He died on Aug. 12, 1865, in his eighty-first year, and was buried in the churchyard of St. Anne's, Kew. Here it should be mentioned that his residence at Hales-

worth comprised the period 1809-1820. The story of the elder Hooker's varied career was mirrored with filial care by his son Joseph in the *Annals of Botany*. Early devoted to ornithology, entomology, and botany, he found a friend in Sir Joseph Banks. On the latter's advice he explored Iceland (1809). From 1820 to 1840 he was Regius professor of botany in the University of Glasgow. A vigorous pedestrian, Hooker, when taking weekly rest at Helensburgh, habitually on Sunday walked to Glasgow—twenty-two miles—to be in time for his eight o'clock Monday morning class. In 1841 he became director of the Botanic Gardens, Kew, remaining in office twenty years. Sir Joseph Hooker, born at Halesworth, on June 30, 1817, graduated at the University of Glasgow in the medical faculty. His scientific achievements, whether as naturalist, traveller in unexplored regions of the world, or as a master of botanical nomenclature, scarcely need recapitulation. His friendships were with men such

as Darwin, Lyell, Huxley, Wallace. He followed his father in the directorship at Kew, became president of the Royal Society, and was an original member of the Order of Merit. Hooker the younger died in 1911, aged ninety-four years.

ON Aug. 19 occurs the centenary of the birth of the distinguished German chemist Julius Lothar Meyer, whose career recalls some of the most famous men of science and some of the greatest scientific achievements of the nineteenth century. The son of a doctor, Lothar Meyer became the pupil of Virchow, Ludwig, Bunsen, Kirchhoff, and Neumann; he succeeded Fittig and was the joint recipient with Mendeléeff of the Davy medal of the Royal Society. Born at Varel in Oldenburg, a province which had already given Mitscherlich to chemistry, Meyer became a student of medicine at Zurich and Würzburg, and it was on the advice of Ludwig that he devoted himself to chemistry. At Heidelberg, where he attended the lectures of Bunsen and Kirchhoff, he counted among his fellow-students Baeyer, Roscoe, Beilstein, and Quincke. Appointed a *Privatdozent* at Breslau in 1859, he undertook the direction of the laboratory of the Physiological Institute and in 1864 published his "Modernen Theorien der Chemie", by which his name was first brought into prominence. Two years were spent as a teacher at the school of forestry at Neustadt, Eberswalde, and in 1868 he was called to Carlsruhe, where for a time his work was interrupted by his care for the wounded of 1870. His final appointment came in 1876, when he was chosen successor to Fittig in the chair of chemistry at Tübingen, and this position he held until his death at Rastede on April 11, 1895. His brother, Oskar Emil Meyer (1834-1909), was the well-known physicist.

THE life of Lothar Meyer was written by his pupil Seubert, while the memorial lecture to the Chemical Society was delivered by Prof. P. P. Bedson in 1896. With great intellectual gifts, Lothar Meyer possessed characteristics which gained for him the esteem and appreciation of his contemporaries. Though his scientific publications embraced a great variety of subjects, his name is best known for the share he had with Newlands in England and Mendeléeff in Russia in the periodic classification of the elements. Speaking of the Periodic Law, Thorpe said: "The first chemist of note to grasp the significance of Mendeléeff's generalisation was Lothar Meyer, who, dealing at the outset with one of the characteristic properties of the elements viz. their specific or atomic volumes . . . greatly developed the principle of periodicity, representing it graphically in a most striking and suggestive manner, leading up to a classification almost identical with that of Mendeléeff". It was for this work that Lothar Meyer was awarded the Davy medal in 1882. Lecturing three years later, Meyer himself spoke of Mendeléeff's contribution as forming "the coping stone of the building which in the course of years has been erected on the foundation of Döbereiner's Triads, as a work which did not, like Pallas Athene, spring ready armed

from the head of a Jove, but has been gradually completed by the slow, painstaking, and often apparently vain endeavours of a whole series of workers".

THE Royal Institution has issued further particulars of the arrangements being made to celebrate the historic discovery by Faraday of electro-magnetic induction, recorded in his diary on Aug. 29, 1831. Jointly with the Institution of Electrical Engineers, the Royal Institution has drawn up a provisional programme for Sept. 21-23 next year. The first day will be devoted to the reception of delegates at the Royal Institution and a Faraday commemorative meeting in the Queen's Hall, the proceedings of which will probably be broadcast by the B.B.C. Following this will come the joint conference of the Institution of Electrical Engineers and allied associations, conversaciones at both the Royal Institution and the Institution of Electrical Engineers, and the opening of a Faraday Exhibition in the Albert Hall. The latter, which will be open to the public for about ten days, will include reproductions and illustrations of Faraday's work, and special exhibits showing the full development of electrical and chemical science and industry which have their origin in his researches. It is further proposed to publish Faraday's diary of his experimental work in full and to issue a souvenir volume. The delegates will also be entertained by the Royal Society. The Faraday celebrations will precede immediately the opening of the centenary meeting of the British Association, which is to take place on the evening of Sept. 23 in the Central Hall, Westminster.

THE purpose of the work of the Rothamsted Experimental Station is, as the director, Sir John Russell, states at the beginning of his recently issued annual report, "to discover the principles underlying the facts of agriculture and to put the knowledge thus gained into a form in which it can be used by teachers, experts and farmers for the upraising of country life and the improvement of the standard of farming". But the results of the work of the large and expert staff engaged in the Rothamsted laboratories and on the experimental plots contain much of scientific interest, especially as regards certain specific problems. The artificial inoculation of lucerne, a process developed in the Bacteriological Department for supplying the nitrogen-fixing organisms, is increasingly used at home and overseas. Study of the relationship of the nodule-organisms to the plant has shown that they do not normally enter the plant until the true leaves begin to form, when the root extrudes a substance, not yet determined, which facilitates their entry. Work on barley indicates the possibility of visualising the relationship between growth and the quality of the grain; and a simple method has been elaborated for estimating the amount of extract obtainable from a given sample of malt, an important aid to the maltster. Experiments with sugar beet emphasise the need of new varieties better suited to English conditions. The roots refuse to respond to schemes of manuring which are successful with mangolds and potatoes, though there is an increase in the leaves.

OF great value to overseas farmers is a process which has been devised at Rothamsted for converting straw and other cellulose-containing plant residues, such as the 'trash' from sugar-cane plantations, into useful manure. The chemistry of the process is being worked out. The organisms mainly concerned in the decomposition of the straw are fungi, including several *Aspergilli* and *Actinomycetes*. An important discovery by the Microbiological Department is that of a group of nitrifying organisms producing nitrites from various ammonium salts, but differing from the previously known forms, *Nitrosomonas* and *Nitrosococcus*, in that they thrive in the presence of organic matter. They are found to be commonly distributed in the soil. In the Plant Pathological Department physiological and genetical work on fungi has been continued. The subject is a complex one. Strains apparently identical in structure and cultural reactions differ markedly in pathogenic properties, and conversely, strains different in structure and cultural reactions have similar pathogenic properties. Two or more strains are frequently intermingled in one host-plant. Progress has also been made in the study of virus diseases, those elusive phenomena which can only be studied in their effects on the infected plant. The activities of the staff are indicated by the inclusion of abstracts of the scientific papers, twenty-seven in number, published during the year. The report may be obtained from the Secretary of the Rothamsted Experimental Station, Harpenden, price 2s. 6d.

ARCHÆOLOGICAL excavations on the projected line of the new by-pass at Colchester have now been in progress under Mr. C. L. Hawkes of the British Museum since the middle of June. It will be remembered that this work was undertaken by the Colchester Excavation Committee to avert the loss of valuable archæological material by the making of the new road. The area of operations has since been extended owing to the purchase of adjacent land by the Essex County Council for playing-fields, which has been placed at the disposal of the Committee until the end of August. The results obtained to date, of which a report appeared in the *Times* of Aug. 4, are of very great interest, especially in their bearing upon the relations of Britain and the Continent in the century before the Roman conquest. They fully support what was previously known of the importance of Colchester as a centre of British culture and prosperity. It would appear that this low-lying site was an overflow area from the British town, at first not too thickly populated. Then after several decades, at about 10 B.C., it was more thickly settled under Cunobelinus. The site was abandoned at about 47-50 B.C. when the Romans built their Colonia near by on virgin ground. In the ten-acre field, nearer the Roman site and farther from the centre of the Celtic town, the remains are more scattered. The abundant pottery and metal work point to a period of great prosperity in British Colchester for a period of fifty to sixty years before the Roman conquest. With much native pottery and many native brooches

is a large proportion of imported ware and ornaments, pointing to a considerable volume of pre-Roman trade with Italy, southern and northern Gaul, Belgium, and the Rhine area. The numerous coins include early Roman types, issues of Cunobelinus himself, the Iceni and native issues from Gaul. The conduct of the excavations has now been taken on by Mr. J. N. L. Myres of Oxford.

THE menacing condition of the South Italian volcanoes is fully discussed by Prof. H. Reck in *Matériaux pour l'Étude des Calamités*, No. 1, 1930. The changes in Vesuvius since 1906 as studied by Malladra and Friedlaender are passed in review and the lava-flows of 1926, 1927, 1928, and 1929 are described with maps. The later eruptions are distinguished not only by the higher temperatures of effusion but also by the greater abundance of the gases and the increase in hydrochloric acid. Vesuvius is clearly heading towards another catastrophic outburst like that of 1906. The villages on the southern flank (Terzigno, etc.) are most likely to be in danger from future flows, if, as is anticipated, the southern walls of the cone are fractured by the accumulating stresses. Areas likely to be overwhelmed with ashes and vapours cannot be predicted, as they will depend on the atmospheric conditions at the time. Etna is also in a slow crescendo of activity as indicated by the 1928 eruption and its unusually high temperature. Although there can be no direct connexion between the volcanic hearths of Etna and Vesuvius, there have nevertheless been numerous coincidences between their eruptions which suggest that both may be affected by common tectonic disturbances.

It is known that for every kilogram of grain consumed in the world to-day there is approximately a kilowatt hour of energy expended. The grain is a necessity, but some think that the world would be happier without this great expenditure of machine labour. The rapidly advancing mechanisation of labour is, it is thought, tending to make work more monotonous and hence leads to a craving after amusement and to the lowering of the mentality of the race. In an address to the World Power Conference at Berlin, an abstract of which is given in the *Electrical Review* for Aug. 8, Dr. A. F. Enstrom combats this view. In his opinion, the operation of machines instead of dulling the faculties sharpens them. A skilled operator is instantly on the alert when the noise made by his machine alters by a minute amount. His powers of observation are always being exercised. The younger generation seems to grasp with ease how to operate motor-cars and how to look after machinery. Schoolboys even have done valuable research work with home-made radio sets. The great advantage of the mechanisation of labour is that it makes possible an eight hours' day. The labourer has to expend much less muscular effort during the course of it. There is no evidence that this lowers his mentality and he has opportunities for improving his knowledge which his predecessors never had.

THE scientific instrument industry of Great Britain has deservedly a high reputation for the quality of its

products, a reputation which the Institute of Physics has done much to foster through the publication of the *Journal of Scientific Instruments*. Appreciation of its services to the industry is shown by the recent decision of the British Optical Instrument Manufacturers Association to offer an annual prize, to be known as the B.O.I.M.A. Prize, for the best paper appearing in the *Journal of Scientific Instruments*. The prize, which is of the value of ten guineas, is offered for a period of five years, the award being entirely in the hands of the Board of the Institute of Physics. The Board has accordingly decided that in awarding the prize, all papers appearing in the *Journal* during the year will be considered and due weight will be given to (1) originality, (2) scientific value, (3) practical utility to instrument makers or users, (4) presentation. The first award will be made in 1931 in respect of a paper published in the *Journal* during 1930. It is also announced that through the generosity of a member of the Board, it has become possible for the Institute to offer a prize of £5 for the best "Laboratory and Workshop Note" which appears during the year. The donor has guaranteed this prize for a period of five years. These notes serve a useful purpose in acting as the medium through which the devices, special methods, etc., evolved in one laboratory or workshop are passed on to other workers. The first award of this prize will also be made in 1931, in respect of a note published in the *Journal* during 1930.

A SERIOUS obstacle in the development of radio telegraphy and telephony was the difficulty in developing high voltage direct current for supplying the amplifiers of transmission plants, as the necessary voltages vary from 9000 to 30,000. An early solution was to adapt motor generator sets coupled in series so as to obtain the requisite voltage. The large demand led to considerable improvements in their design so that sets can now be built which will give pressures of 15,000 volts. The main drawback to this solution was the comparatively long time required to start the reserve set if anything went wrong. The next solution was thermionic rectifiers, which can be put into use at a moment's notice. The disadvantage in this case was the great expense of upkeep, as their life is limited to about 5000 hours. The most recent and perhaps the best solution is to use mercury arc rectifiers. We learn from the *Brown Boveri Review* for July that this solution has been adopted by Marconi's Wireless Telegraph Co., Ltd., in the firm's research laboratories at Chelmsford. The rectifier and rectifier transformer were designed for an output of 400 kilowatts at direct current pressures of 9000, 10,000, and 12,000 volts. The plant was installed a year ago and has given entire satisfaction. It has a high efficiency, can be started at a moment's notice, and withstands short circuits. Water cooling of the rectifier is not necessary as radiation and convection suffice to lead away the thermal losses. The new large broadcasting station which is to be opened shortly at Warsaw will be equipped with two Brown Boveri rectifiers which will give an output of 500 kilowatts at from 10,000 to 15,000 volts.

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THE meetings of the International Electrotechnical Commission which were held on June 27–July 9 in all three Scandinavian countries were very successful, twenty-two countries being represented. The opening meeting was held in Copenhagen, the advisory committees carried out their work in Stockholm, and the plenary meeting took place at Oslo. The committee on nomenclature after considerable discussion adopted the following names for the magnetic C.G.S. units. The unit of magnetic flux was called the 'maxwell' and the unit of flux density the 'gauss'. The unit of magnetic field intensity was called the 'oersted' and of magnetomotive force the 'gilbert'. It will be some time, however, before these names are adopted in text-books in Great Britain. Following the Italian suggestion, a unit  $10^8$  times as large as the maxwell has been adopted for practical engineering use. It is proposed to call it the 'pro-maxwell'. The committee on the rating of machinery had a long discussion as to the maximum permissible temperature at which machinery and apparatus should work. Engineers consider that a few degrees centigrade in the permissible temperature is of great practical importance. A unanimous decision was ultimately reached. The symbols committee reached agreement on the symbols to be used in telephony, telegraphy, radio communication, and electric traction. It was thought a pity that the standardised symbols are not more widely used by the Press and in industry. The aluminium committee had difficulty in reconciling European and American practice, but some progress was made in this direction. A proposal to standardise 132 kilovolts, which is the British grid pressure, was rejected.

A RECENT *Daily Science News Bulletin* issued by Science Service, Washington, D.C., gives some details about the progress of the plans which are being developed by Dr. Robert Goddard, professor of physics at Clark University, Worcester, Mass., for exploring the atmosphere at high levels by means of rockets. A liquid propellant has been perfected which is said to have many advantages over gunpowder or similar explosives. The rocket continually becomes lighter as it ascends owing to the burning of the propellant. The rockets will be sent upwards from a steel tower at Camp Devens, near Worcester, Mass. As yet only small rockets have been fired, which have ascended to levels of but a few hundred feet. A grant has recently been made by Mr. Daniel Guggenheim for the extension of the experiments, and an influential advisory committee has been appointed in connexion therewith. When it becomes possible to send rockets up to altitudes measured in tens of kilometres instead of hundreds of feet, carefully devised instruments will be added to the rocket with a parachute to bring them safely to earth when the charge is exhausted.

TRIALS of new and improved combine harvester-thresher machines have been arranged by the Ministry of Agriculture at Wellingore, Kesteven, Lincs., through the courtesy of Mr. Geoffrey Nevile. Farmers desirous of seeing these machines in operation may either send the cost of a telegram, or telephone to the

Estate Office, Wellingore (14X5 Fulbeck, Grantham), and they will be informed so far as possible of the exact day or days when harvesting is being carried out. At first it was thought that such machines would be unsuitable in England, since the grain in this country is much more moist at harvest time than is the case in Canada or the United States, where the combine method is widely used. However, judging from last year's experience in the trials carried out by the Oxford Institute of Agricultural Engineering, it seems probable that, although in some seasons a drying plant might be necessary, threshing may be safely carried out after the grain has stood for a day or two in summer heat. This view is supported by experience abroad, and the combined machine is becoming increasingly used in countries with cooler and wetter climates. Given favourable conditions for hire or purchase, the farmer would gain considerably by their general introduction into Great Britain, as not only would the total cost of harvesting and threshing be reduced, but also loss from vermin or mould in the stack be avoided.

THE Balkans correspondent of the *Times* gives an interesting account—in the issue of Aug. 4—of the health reform measures carried out in Yugoslavia during the last ten years. The person to whom most credit is due is Dr. Andriya Shtampar, who was appointed head of the Department of Hygiene in the Ministry of Health in 1919. The sanitary condition of the country was then deplorable, not only as the result of the War but also as the consequence of centuries of neglect, as was shown by the fact that 80-90 per cent of the population were infected with malaria and syphilis, while enteric fever, typhus, and smallpox were extremely rife. Dr. Shtampar's first step was to provide himself with competent assistants, who had to be trained abroad, and then to persuade the government to supply the necessary funds for his reforms. Since 1923, when he was first really able to start work, he has organised three main categories of institutions: (1) central institutes for each of the nine provinces, (2) 80 district health institutes, and (3) about 500 village stations. The central institutes comprise departments of bacteriology and parasitology, social medicine, and sanitary engineering. The district institutes contain departments for mother and child welfare, dispensaries for venereal diseases and tuberculosis, bacteriological laboratories and bath houses. The village institutes consist of a dispensary in charge of a nursing sister, a small health exhibition, and a shower bath. A school of hygiene is attached to the Zagreb Central Institute for the training not only of doctors and nurses but also for instructing the more intelligent peasants in the general principles of hygiene. Dr. Shtampar's work has received liberal aid from the Rockefeller Foundation as well as the strong support of King Alexander. The reduction in epidemic disease as the result of these measures has been most gratifying. During the last two years, there have not been more than a hundred cases of typhus in the country, there has been no smallpox for more than a year, and the incidence of malaria

has fallen from 80 to 10 per cent, while there is a good prospect of a healthy generation growing up in formerly disease-ridden areas.

THE following appointments have been made by the Secretary of State for the Colonies: Dr. G. Bryce to be deputy assistant director of agriculture, Nigeria, Mr. B. G. Montserin to be agricultural officer, Trinidad.

THE Royal Microscopical Society, after residing in Hanover Square, London, for some forty years, has removed to new apartments in B.M.A. House, Tavistock Square, Bloomsbury, W.C.1, in which its library and slide collections will be more adequately housed, and where, in addition to the Society's lecture halls, meeting rooms, and offices, a portion of its unique collection of historical instruments will be on permanent exhibition.

At the Brisbane meeting of the Australasian Association for the Advancement of Science which took place on May 28–June 4, it was decided by the General Council to change the name of the Association to "The Australian and New Zealand Association for the Advancement of Science". The Mueller Memorial Medal for 1930 was awarded to Sir Douglas Mawson for his contributions to Australian geology, associated with which are his achievements in geography and exploration. The first Liversidge Research Lecture under the bequest from the late Prof. A. Liversidge was delivered by Prof. N. T. M. Wilmore, of the University of Western Australia, the title of the lecture being "Chemical Research and the State".

DR. HAROLD THOMPSON, senior naturalist on the staff of the Fishery Board of Scotland, has sailed for Newfoundland, where he will undertake on behalf of the Government of Newfoundland and of the Empire Marketing Board a survey of the fisheries. This is the first step in the formulation of a scheme having as its object the development on scientific lines of Newfoundland fisheries. The work in contemplation will embrace a systematic and statistical review of the fishery resources with the view of developing methods for the preservation, handling, and marketing of the fish (including brine freezing), and for the utilisation and marketing of surplus fish and fish by-products. The cost of the preliminary survey is being shared equally between the Government of Newfoundland and the Empire Marketing Board.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A full-time teacher for mining courses under the West Riding Education Committee—The Education Officer, County Hall, Wakefield (Aug. 18). A cotton entomologist and an assistant pathologist in the Department of Agriculture and Stock, Brisbane—The Official Secretary, Queensland Government Offices, 409 Strand, W.C.2 (Aug. 20). A lecturer in civil engineering in the University of Birmingham—The Secretary, The University, Birmingham (Aug. 21). A temporary research assistant in civil engineering in the University of Birmingham—The Secretary, The University,

Birmingham (Aug. 21). Principal teachers of, respectively, mechanical engineering, mathematics and physics, and chemistry; also a qualified mechanic for taking care of the plant, and a laboratory steward to take charge of the laboratories at the Technical College, Coatbridge—The Director of Education, Lanarkshire House, 191 Ingram Street, Glasgow, C.1 (Aug. 22). A junior assistant in the department of the War Department Chemist—The War Department Chemist, B.47, Royal Arsenal, Woolwich, S.E.18 (Aug. 23). A lecturer and demonstrator in the pharmacy department of the Birmingham Central Technical College—The Principal, Central Technical College, Suffolk Street, Birmingham (Aug. 25). A cacao soil research chemist at the Imperial College of Tropical Agriculture, Trinidad—The Secretary, Imperial College of Tropical Agriculture, 14 Trinity Square, E.C.3 (Aug. 30). A lecturer in mechanical engineering at the Norwich Technical College—The Principal, Technical College, Norwich (Sept. 3). An assistant in the Cancer Research Laboratories of the University of Manchester—The Registrar, The University, Manchester (Sept. 7). A demonstrator in chemical pathology in the University of Manchester—The Registrar, The University, Manchester (Sept. 13). A medical man or woman research worker

in mental deficiency under the Medical Research Council, the governing body of the Darwin Trust, and the Committee of the Royal Eastern Counties Institution for the Mentally Defective at Colchester—The Medical Superintendent, Royal Institution, Colchester (Oct. 3). A chemical laboratory assistant in the experimental department of the Fine Cotton Spinners' and Doublers' Association, Ltd.—Prof. F. P. Slater, Rock Bank, Bollington, Macclesfield. Assistant masters for engineering subjects and for chemistry at the Smethwick Junior Technical School—The Director of Education, Education Offices, High Street, Smethwick. An assistant under the Directorate of Ballistic Research, Research Department, Woolwich, with several years' research experience in physics—The Chief Superintendent, Research Department, Woolwich, S.E.18. A temporary research assistant in a Government Department, with, preferably, a knowledge of rubber technique and mechanical methods—The Chief Superintendent, Chemical Warfare Research Department, 14 Grosvenor Gardens, S.W.1. A temporary laboratory assistant in a Government Department, with, if possible, a general knowledge of chemistry and physics and of rubber manufacture—The Commandant, Experimental Station, Porton, near Salisbury.

### Our Astronomical Column.

**New Variable Stars in the Constellation Norma.**—Arrangements have been made for the interchange of observers between the observatories of Johannesburg and Leyden. Mr. H. van Gent has taken a number of plates with the Franklin-Adams telescope at Johannesburg which were measured at Leyden by W. E. Kruytbosch (*Bull. Astr. Instit. Netherlands*, vol. 5, No. 194). The blink-microscope revealed 25 variables upon them, and afforded sufficient material for plotting the light-curves, which are given in the *Bulletin* together with diagrams of the fields. The second star on the list is an eclipsing variable of the W. Urs. Maj. type. Prof. Hertzprung suggests, from the long stationary minimum, that either the companion is a white dwarf or that the system contains a third star from which most of the light comes during minimum. There are also some Cepheid variables:  $p$  on the list has a period of 2.4 days and a large light-range.

**Images of Pluto on Yerkes Observatory Plates.**—*Astr. Nach.* 5719 contains particulars of the measures of the image of Pluto, detected by Dr. F. E. Ross on plates exposed on Jan. 29, 1921 (two plates) and Jan. 6, 1927. The positions are for the equinox of 1930.0. The magnitude of Pluto was estimated as 15 on each date.

U.T.	R.A.	N. Decl.	Aperture.	Focal Length.	Exposure.
1921.			(Inches.)	(Inches.)	(Minutes.)
Jan. 29-0896	6 <sup>h</sup> 31 <sup>m</sup> 22.04 <sup>s</sup>	19° 43' 13.7"	10	50	192
	22.01	13.6			
	22.28	14.1	6	30	192
1927.					
Jan. 6-2500	7 4 3.17	21 13 3.1	3	21	120

The estimated probable error is 1" for the focal lengths 30 in. and 21 in., somewhat less for the 50-in. focus. The first 50-in. measure and the 30-in. measure were made by Prof. van Biesbroeck using

three comparison stars in the Paris Astrographic Catalogue. The other measures were made by Dr. F. E. Ross using the star Berlin A 2257 for the 1921 plate, and three Paris Astrographic stars for the 1927 plate. No proper motions were applied. The 1927 position is in good accord with the revised measures of the image obtained at Uccle on Jan. 27, 1927. It is stated that the 1921 images were identified with the aid of the ephemeris of Prof. T. Banachiewicz (*U. A. I. Circular* 284), and the 1927 one with the aid of a manuscript ephemeris by Messrs. Bower and Whipple.

*Astr. Nach.* 5719 also contains a useful collection of the observations of Pluto obtained in March and April last: they are compared by Dr. C. H. Smiley with an ephemeris which he deduced from the following heliocentric positions and velocities derived by Prof. Banachiewicz for the date March 31.0 and the equinox of 1930.0.

Daily Change.	
$x = -13.29363$	$-0.0020443$
$y = +35.84738$	$-0.0017048$
$z = +15.41587$	$+0.0000824$

**The Photo-electric Cell at Berlin-Babelsberg.**—*Astr. Nach.* 5713 contains a study by P. Guthnick and R. Prager of early-type stars, the duplicity of which had been detected at the Victoria Observatory by spectroscopic observations by Dr. Plaskett and Dr. Pearce. In five cases light-variation was detected, indicating mutual eclipses. *H.D.* 19820 has minimum masses of 19 and 9 times that of the sun. It is of type O8, but its colour is yellow: the other stars on the list are also yellow. *H.D.* 25638 has a period of 1.1487 days from the Berlin observations. Plaskett found a velocity range of 293 km./sec., but did not determine the period. *H.D.* 25639 is also an eclipsing binary, only 18" from the preceding star, with which it forms the pair  $\Sigma 485$ , but the light range is only 0.05 mag. The period is not yet determined.